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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,474	12/12/2003	Eric C. Leuthardt	60005161-0061	2473

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EXAMINER

MALLARI, PATRICIA C

ART UNIT	PAPER NUMBER
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3736

DATE MAILED: 12/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/735,474	<b>Applicant(s)</b> LEUTHARDT ET AL.	
	<b>Examiner</b> Patricia C. Mallari	<b>Art Unit</b> 3736	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### ***Information Disclosure Statement***

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

The information disclosure statement filed as a listing of references (pp. 30-37) in the specification fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

### ***Claim Objections***

Claims 1, 5, 7, and 12 are objected to because of the following informalities:

On line 1 of claim 1, "BCI" should be replaced with "brain computer interface (BCI)"

On line 3 of claim 1, "ECoG" should be replaced with "electrocorticography (ECoG)"

On line 5 of claim 1, "; and" should be replaced with "; and,"

On line 6 of claim 1, "acquisition computer" should be replaced with "acquisition computer, "

On line 1 of claim 5, "BCI" should be replaced with "brain computer interface (BCI)"

On line 1 of claim 5, "ECoG" should be replaced with "electrocorticography (ECoG)"

On line 3 of claim 7, "an ECoG-based BCI" should be replaced with "an electrocorticography (ECoG) based brain computer interface (BCI)"

On line 3 of claim 12, "ECoG" should be replaced with "electrocorticography (ECoG)"

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, and 5-8 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 6,171,239 to Humphrey. Humphrey discloses a brain computer interface (BCI) comprising an electrode array 5 implanted beneath the scalp of a user for acquiring electrocorticography (ECoG) signals of the subject (figs. 1 & 4-6; col. 7, lines

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24-31; col. 7, line 65-col. 8, line 8; col. 8, lines 38-42), wherein an ECoG signal is one of electrical activity recorded by means of electrode placed directly on the cerebral cortex (p. 5, lines 1-4 of the instant specification). An acquisition computer 42 is coupled to the array 5, 35, 40 for collecting and storing the ECoG signals (figs. 5 & 6; col. 9, line 49-col. 10, line 28). A BCI computer is coupled to the acquisition computer and has software configured to analyze the ECoG signals to determine an intent of the user (figs. 1 & 10; col. 12, lines 55-col. 13, line 22).

Regarding claims 2 and 6, an output device 200 is communicatively coupled to the BCI computer, and the BCI computer is configured to generate a device command from the intent of the user (fig. 1; col. 14, lines 19-29).

Regarding claims 7 and 8, Humphrey discloses a method for providing control of an output device by a user wherein an ECoG-based BCI is provided to a user for determining an intent of the user from ECoG signals of the user's brain activity. The intent of the user is communicated to the user of the output device (figs. 1 & 10; col. 7, lines 24-31; col. 8, lines 38-42; col. 12, lines 55-col. 13, line 22; col. 14, lines 37-60). With further regard to claim 8, the user's brain activity is monitored and ECoG signals of the user's brain activity are collected (col. 7, lines 24-27; col. 7, line 65-col. 8, line 8; col. 8, lines 38-42). The ECoG signals are computer processed to determine the intent of the user with respect to the output device (figs. 1 & 10; col. 9, line 55-col. 10, line 28; col. 12, lines 3-14; col. 12, line 55-col. 13, line 22), and a device command is generated from the intent of the user and communicated to the output device (col. 14, lines 19-28).

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Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,615,076 to Mitra et al. Mitra teaches a brain computer interface (BCI comprising an electrode array 804 implanted beneath the user's scalp for acquiring ECoG signals (col. 4, lines 39-64), an acquisition computer 806, 808 coupled to the array 804 for collecting and storing the ECoG signals (fig. 8, col. 5, lines 15-32). The acquisition computer 806, 808 is coupled to a BCI computer 810, 812 having software configured to analyze the ECoG signals to determine an intent of the user (fig. 8; col. 5, lines 36-57; col. 6, lines 62-67; col. 7, lines 1-12).

Regarding claims 2 and 6, an output device 822 is communicatively coupled to the BCI computer 810, 812, and the BCI computer 810, 812 is further configured to generate a device command from the intent of the user (fig. 8, col. 8, lines 13-22).

Regarding claims 3 and 11, the electrode array 804 provides signals of mu (8-12 Hz; see p. 7, lines 5-7 of the instant specification), beta, and gamma rhythms of the user (col. 5, lines 23-32; col. 7, lines 42-48).

Regarding claims 4 and 12, the electrode array 804 provides signals having a significant frequency content of greater than 40 Hz (col. 4, lines 10-38; col. 5, lines 23-32; col. 7, lines 43-48).

Regarding claims 7-12, Mitra describes a method of providing an ECoG based BCI to a user for determining the intent of the user from the ECoG signals of a user's brain activity and communicating the intent of the user to the output device (fig. 8; col. 4, lines 38-67; col. 5, lines 15-50; col. 6, lines 62-67; col. 8, lines 13-22).

With further regard to claim 8, the method comprises monitoring the user's brain activity and collecting ECoG signals of the user's brain activity (col. 4, lines 38-67). The ECoG signals are computer processed to determine the user's intent with respect to the output device and a device command to the output device is generated from the intent of the user and communicated to the output device (col. 5, lines 15-50; col. 6, lines 62-67; col. 8, lines 13-22).

With further regard to claim 9, the method further comprises monitoring a position or response of the output device and providing feedback to the user on the position of the output device with respect to a target position or predicted intended movement (col. 8, lines 23-40).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitra and further in view of US Patent No. 5,298,890 to Kanamaru et al. Mitra discloses a method of controlling movement of a pointing device on a display screen (cursor) wherein a subject's ECoG signals are monitored (col. 4, lines 38-67 of Mitra) and analyzed to determine the intent of the user with respect to the cursor movement (col. 5, lines 15-50; col. 6, lines 62-67 of Mitra). A device command to move the cursor is generated from the intent of the user (col. 8, lines 17-22 of Mitra). Feedback is provided

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to the user on the current position of the cursor (col. 8, lines 27-32 of Mitra). The ECoG signal may be reanalyzed to determine an intended correction by the user with respect to the cursor movement (col. 8, lines 33-40 of Mitra), where processing a subsequent signal in which the user has compensated for error is a reanalysis of ECoG signal to determine the intended correction by the user, and generating a command based on the compensated intended movement is a communication of the intended correction to the computer monitor to modify cursor movement. Mitra is silent as to the details of effecting cursor movement. However, Kanamaru describes a method in which cursor movement is effected by comparison of the current cursor position with the intended movement (fig. 2; col. 4, lines 1-17 of Kanamaru). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Kanamaru with that of Mitra, since Mitra teaches a method in which the movement of a pointing device on a display screen, or cursor is effected, and Kanamaru describes an appropriate method of effecting such movement.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitra in view of Kanamaru, as applied to claim 12, above, and further in view of US Patent No. 5,638,826 to Wolpaw. Mitra is silent as to the number of dimensions of movement considered in analyzing the ECoG signal and communicating the user's intent to the computer display. However, Wolpaw discloses a method of controlling cursor movement on a computer display using brain activity wherein the brain activity is analyzed to determine the user's intent with respect to the cursor movement in at least two dimensions, and a command to move the cursor in at least two dimensions is



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generated (col. 8, line 59- col. 9, line 52; col. 11, lines 45-55 of Wolpaw). Therefore, it would have been obvious to one ordinary skill in the art at the time of invention to combine the method of Wolpaw with that of Mitra, as modified by Kanamaru, since Mitra, as modified, teaches analyzing brain activity to effect cursor movement, and Wolpaw describes an appropriate way of doing so.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent No. 6,609,017 to Shenoy et al.

US Patent No. 4,987,411 to Ishigami.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia C. Mallari whose telephone number is (571) 272-4729. The examiner can normally be reached on Monday-Friday 10:00 am-6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Max Hindenburg can be reached on (571) 272-4726. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
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